

Appl. No. 10/535,050
Amdt. Dated July 27, 2009
Amdt. following telephone interview of July 23, 2009

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Amendments to the Claims:

The listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A process for the manufacture of carbon nanostructures, the carbon nanostructures being selected from carbon nanotubes and carbon nano-onions, the method comprising the steps of injecting a carbon-containing gas substance via a fast quenching nozzle attached to a high enthalpy electrode-generated direct current thermal plasma torch into a plasma flame generated from a plasma forming gas to provide atomic carbon, which in the presence of in situ in situ generated nanometer sized metal catalyst particles that act as nucleation points for the growth of carbon nanostructures, produce the carbon nanostructures, and collecting the carbon nanostructures.
2. (Currently Amended) A process as claimed in claim 1 wherein the carbon-containing gas substance is injected together with a carrier gas.
3. (Original) A process as claimed in claim 2 wherein the carrier gas and the plasma forming gas are each selected from helium, argon, nitrogen and air, and they are the same or different.
4. (Cancelled)
5. (Cancelled)
6. (Currently Amended) A process as claimed in claim [[4]] 22 wherein the

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carbon-containing gas substance is tetrachloroethylene.

7. (Currently Amended) A process as claimed in claim [[4]] 1 wherein an electrode generates the metal vapor in the plasma torch which metal vapor nucleates into nanoparticles in the zone of nanostructure formation.
8. (Original) A process as claimed in claim 7 wherein the electrode is selected from iron, tungsten, nickel, cobalt, chromium, molybdenum, palladium, platinum, ruthenium, rhodium, hafnium, gadolinium electrodes and combinations thereof or copper electrodes coated with one or more of such metals.
9. (Original) A process as claimed in claim 7 wherein a tungsten electrode is used.
10. (Original) A process as claimed in claim 9 wherein a tungsten nozzle is used.
11. (Currently Amended) A process as claimed in claim 7 wherein the amount of catalyst nanoparticles and of carbon-containing gas substance are controlled independently.
12. (Original) A process as claimed in claim 11 wherein the metal vapor content in the plasma is controlled by the electric arc current in the plasma torch and the quantity of carbon in the system is controlled by the carbon source gas volumetric flow.
13. (Original) A process as claimed in claim 1 wherein the catalyst is derived from at least one metal powder injected into the outlet flame of the torch.
14. (Original) A process as claimed in claim 1 wherein the catalyst is generated

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from droplets of metal generated from a metal sample brought into contact with the flame.

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Currently Amended) A process as claimed in claim [[4]] 1 wherein the nozzle is selected from water-cooled nozzles, ceramic coated nozzles and ceramic nozzles.

20. (New) A process as claimed in Claim 13 wherein the metal catalyst particles are melted, vaporized in part, and sprayed onto a substrate, and the sprayed catalyst particles act as nucleation points for the growth of carbon nanotubes thereon.

21. (New) A process as claimed in Claim 13 wherein the metal catalyst is selected from the group of metals consisting of W, Fe, Ni, Co, Cr, Mo, Pd, Pt, Ru, Rh, Hf, Gd and combinations thereof.

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22. (New) A process as claimed in claim 1 wherein the carbon-containing substance is selected from at least one of liquid hydrocarbons vaporized before injection or vaporized by the thermal plasma after injection in the high enthalpy thermal plasma torch, gaseous hydrocarbons, and solid carbon particles injected along with a carrier gas.